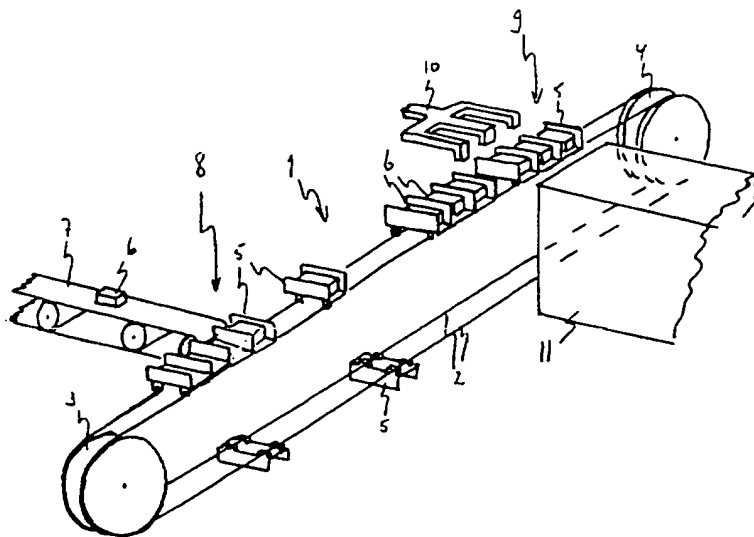




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(54) Title: DEVICE FOR CONVEYING PRODUCTS FROM A PRODUCTION LINE TO A PACKING UNIT



(57) Abstract

Device for conveying products from a production line to a packing unit. The device consists of an endless belt conveyor consisting of two belts, on which a number of containers are placed. The device has a charging station, and a discharging station for the removal of the products. At the underside, the containers are provided with clamping elements which grip around the belts, and the clamping elements consist of two parts which have an L-shaped cross section. The clamping element consists of two L-shaped parts, which L-shaped parts enclose a round opening through which the belt runs. There is play between the belt and the round opening. The containers can be retained at a desired point with the aid of stop means. The device also comprises a formation station, where groups of containers can be separated from each other by means of a cam belt. The belt runs between the return pulleys over guide means, which serve to hold the belt in the horizontal plane and also the two belts at a desired distance from each other.

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Short title: Device for conveying products from a production line to a packing unit.

The invention relates to a device which serves to convey a supply of products coming from one or more production lines to, for example, a packing machine, which device consists of a conveyor with an endless conveyor belt, on which conveyor belt a number of containers are placed with the aid of means, while the device comprises a filling or charging station, and a discharging station for the removal of the products.

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Such a device is known from European Patent Application EP 0,496,046. This patent application discloses a device which consists of a number of containers, which containers are moved along by means of a chain conveyor, having a chain which runs over two return pulleys and circulates continuously with the aid of drive means. Additional devices must be provided in order to take the containers near the two return pulleys from the top to the bottom side, or from the bottom to the top side of the conveyor. The containers are conveyed upwards at the same distance from each other by means of a wheel with a number of seats for the containers.

The object of the invention is a device by means of which products can be moved in a simple way with the aid of containers from a charging station to a discharging station, and by means of which the containers can then be moved back again from the discharging station to the charging station, and in the case of which the device is simpler and cheaper than the devices known until now. Another object of the invention is to group the containers in a simple way, so that at the discharging station one or more containers, each with a product, can be discharged simultaneously, and so that it is possible in a simple manner to discharge several products simultaneously in a specific configuration.

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This object is achieved by a device according to the inven-

tion through the fact that the means with which the containers are placed on the conveyor consist of a clamping element which grips on either side of the conveyor belt, and the clamping element consists of two parts which have
5 an L-shaped cross-section. These measures ensure that the containers can move freely along the conveyor belt, so long as the conveyor belt is moving in a horizontal plane and is thus approximately straight. However, as soon as the conveyor belt becomes curved, as is the case near the return
10 pulleys, the containers will be clamped firmly on the conveyor belt and will consequently be moved along with the conveyor belt to the top or the bottom side of the conveyor. Through their own weight and the friction, the containers will be carried along by the conveyor belt on the
15 straight part, particularly if the containers are not standing completely perpendicular to the conveyor belt and consequently become wedged on the conveyor belt.

In a preferred embodiment of the device according to the
20 invention, said device is characterized in that the conveyor belt consists of a round belt, and the means consist of two L-shaped parts, which L-shaped parts enclose a round opening through which the belt runs, and in that the dimensions of the belt and the round opening are such that the
25 belt is enclosed with play by the round opening of the element. These measures ensure that the containers can be placed on and removed from the conveyor belt quickly and in a very simple manner. The result of this is that the number of containers can be adapted very simply and very quickly
30 to the particular circumstances.

In another preferred embodiment of the device according to the invention, said device is characterized in that the conveyor consists of two belts, and in that each container
35 is provided on the underside with four elements, each with two L-shaped parts, two of which elements enclose one belt, while the other two elements enclose the other belt. It has been found that if such a device is used, the containers can be moved very quickly from one station to the other

station. As soon as the containers are retained in such a way that the belts pass straight through the opening of the clamping elements, the belts will encounter little or no resistance and will not carry along the containers. However, as soon as the containers are no longer being retained and as soon as they assume a position which is at a slight angle relative to the belts, the containers will be wedged on the belts and pulled along with the belts.

10 The invention will be explained in greater detail with reference to the drawing, in which:

Fig. 1 shows diagrammatically in perspective a device according to the invention, as used at the end of a production line;

Fig. 2 shows a side view of the device according to the invention, as shown in Figure 1;

20 Fig. 3 shows in side view another possible application of the device according to the invention;

Fig. 4 shows in top view and bottom view respectively the device according to the invention, as shown in Figure 2 and Figure 3 respectively;

Fig. 5 shows in detail a part of the container with clamping element;

30 Fig. 6 shows a top view of a container with clamping elements;

Fig. 7 shows a bottom view of the container of Figure 6;

35 Fig. 8 shows a bottom view of another possible embodiment of a container used with the device according to Figure 3;

Fig. 9 shows a detail of the end of the conveyor device according to the invention;

Fig. 10 shows a top view of the detail shown in Figure 9;

Fig. 11 shows a detail of the formation station;

5 Fig. 12 shows a container which is placed on a belt;

Fig. 13 shows another possible embodiment of the clamping element and the conveyor means for conveying the containers.

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Figure 1 shows diagrammatically a device 1 according to the invention. The device 1 consists of a belt conveyor which consists of two belts 2 which run over two return pulleys 3, one of the return pulleys also being the drive pulley 4.

15 A number of containers 5 are placed on the belts. In this case the products 6 are supplied by means of two conveyor belts 7 to the filling or charging station 8, where the products 6 are placed one by one in a container 5. This operation can be speeded up by means of accessories which
20 are not shown here. A container 5 filled with a product 6 is then moved by means of the two conveyor belts to the discharging station 9. At the discharging station, several products can be moved simultaneously with the aid of suitable means 10 to a packing machine 11 (shown very diagram-
25 matically here), and may possibly be placed directly in the desired pack.

Figures 2, 3 and 4 show the same device as that shown in Figure 1, the device shown in Figure 2 being a side view of
30 the device of Figure 1. Figure 3 shows another use of the device according to Figure 1, namely that here the device 1 is used upside down and moves the products 6 by sliding them over a flat surface underneath it from the filling or charging station 8 to the discharging station 9. In both
35 applications, a formation station 12 is also shown, where the containers 5 can be allowed through to the discharging station 9 in groups of, for example, three items. This is important if the packaging is also being supplied in groups to the packing machine, so that the products are supplied

to the packing machine at the same pitch as the delivery of the packaging. At the charging station 8, or the formation station 12 and the discharging station 9, the containers 5 are retained by two cam discs 13, which retain the containers in a desired position, so that the containers can be either filled or placed in formation, or emptied. A cam belt 14 is used for separating the containers at the formation station into groups of, for example, two, three or more containers, and the pitch for supplying the products and the packaging is the same. In this embodiment, acceleration belts 14 are fitted on either side of the conveyor belts, near the charging station and the formation station, which acceleration belts serve to set the containers in motion from the stationary position faster as soon as the cam disc 13 or cam belt 15 releases the containers. However, this is not essential, since the containers go out of true as soon as they are no longer retained, and are wedged on the belts. A container can also be launched with the aid of the two cam discs 13.

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Figure 5 shows on a greatly enlarged scale a detail of a container 5 with a clamping element 16, each clamping element being in the form of two L-shaped parts 17 facing each other, two L-shaped parts 17 in each case enclosing an approximately round opening 18, the dimensions of which correspond to the dimensions of the belt 2 in such a way that the belt 2 fits in the opening 18 with play. The round opening 18 is open at the bottom, but the distance 19 between the ends of the two legs is smaller than the cross-section 20 of the belt 2. The belt 2 is placed on two guides 21, which guides can consist of two plates 22 or a metal bar on which two edges are provided. The guide edges 23 are placed in such a way that they point towards the centre point 24 of the belt 2. Using these guides ensures that the two belts do not sag along the straight part, and that the belts remain the same distance apart at all points. This is important in particular for ensuring that the containers can be retained on the belts 2, so that the friction must be as low as possible and the two belts must

run as well as possible through the centre of the round openings.

Figures 6, 7 and 8 show the containers with the clamping
5 elements.

Figures 6 and 7 show a top view and a bottom view respectively of a container of the type used. There is preferably a small space 28 (see Figure 5) between the top edge of the
10 round opening and the bottom edge of the container, to ensure that the container does not jump off the belt 2 when the belt is curved, but that the belt is clamped tightly in the two clamping elements, and in the space between the two clamping elements there is still space left at the top for
15 the belts.

Figure 8 shows a container of the type which can be used with the device shown in Figure 2. The container in this case has only the function of sliding the article or pro-
20 duct over a surface underneath it. For this purpose, the container need then have only one vertical wall.

Figures 9 and 10 show the end of a device according to the invention, in which the two belts 2 are running over the
25 return pulley 3. A number of containers are shown on the two belts 2. A container 5' is running over the return pulley 3 and, due to the fact that the belts are curved, is clamped tightly on the two belts 2. Another container 5" has gone slightly askew on the belts 2, and will therefore
30 become wedged on the two belts and be pulled along in the forward direction with the belts. This container will consequently be pulled against the other containers, which are retained by means of a stop element 25.

35 Figure 11 shows a detail of the conveyor belts 2 with the containers 5 and a cam disc 11, and also a cam belt 12, near the formation station. The stream of containers can be interrupted temporarily by means of the cam disc, and the containers can then be allowed through one by one, so that

the containers are intercepted by a cam 26 of the cam belt 12. The cams of the cam belt are placed at such a distance from each other that the pitch corresponds to the pitch of the packing machine, and thus for each cam the desired
5 number of containers can be intercepted.

Figure 12 shows a container 5 when it is wedged on the two round belts 2, due to the fact that the belts are curved when they run over the return pulleys and the belts then
10 run through the clamping elements at an angle, with the result that said clamping elements clamp down hard on the belts. However, it is also possible per se to use the principle according to the invention by starting with a broad belt conveyor 27, on which the containers are clamped
15 on either side by means of two L-shaped clamping elements of the type shown in Figure 13.

CLAIMS

1. Device which serves to convey a supply of products (6) coming from one or more production lines to, for example, a packing machine (11), which device consists of a conveyor with an endless conveyor belt (2), on which conveyor belt (2) a number of containers (5) are placed with the aid of means, while the device comprises a filling or charging station (8) and a discharging station (9) for the removal of the products, **characterized in that** the means consist of a clamping element (16) which grips on either side around the conveyor belt (2), and the clamping element consists of two parts (17) which have an L-shaped cross-section.

2. Device according to Claim 1, **characterized in that** the conveyor consists of a belt (2), and the means consist of a clamping element (16) which consists of two L-shaped parts (17), which L-shaped parts enclose an opening (18) whose shape corresponds approximately to the shape of the belt (2) or conveyor belt, and through which the belt runs, and in that the dimensions of the belt (2) and the opening (18) are such that the belt is enclosed with play by the opening of the clamping element (16).

3. Device according to one of Claims 1 or 2, **characterized in that** the conveyor consists of two round belts (2), and in that each container is provided on the underside with four clamping elements, each being the shape of two L-shaped parts facing each other, two L-shaped parts in each case enclosing an approximately round opening, the dimensions of which correspond to the dimensions of the belt in such a way that the belt can be moved with play through the opening, and in which two clamping elements in each case enclose one belt, while the other two clamping elements enclose the other belt.

4. Device according to one of Claims 1, 2 or 3, **charac-**

terized in that the containers can be retained at a desired point, such as the charging point and the discharging point, with the aid of stop means (13, 15, 25, 26).

- 5 5. Device according to Claim 4, characterized in that the stop means consist of two cam discs (13) placed parallel to each other, and the containers are provided near the underside with stop cams which can interact with the cams of the cam discs.

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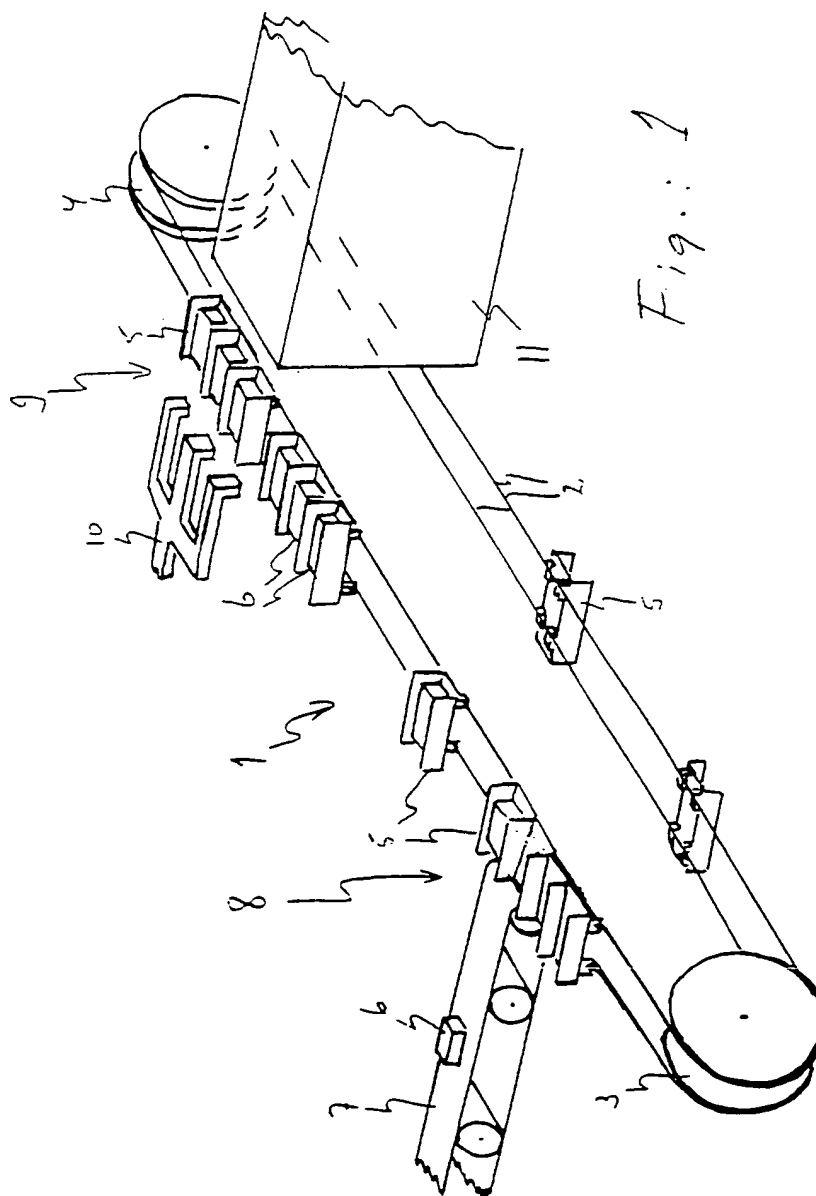
6. Device according to one of the preceding claims, characterized in that the device also comprises a formation station, and in that groups of containers can be separated from each other with the aid of a cam belt (15) or chain,
15 so that the containers are moved in groups to the discharging station.

7. Device according to one of the preceding claims, characterized in that acceleration means (13) are fitted
20 near the points where the containers can be brought temporarily to a standstill, which acceleration means run faster than the speed of the conveyor belt.

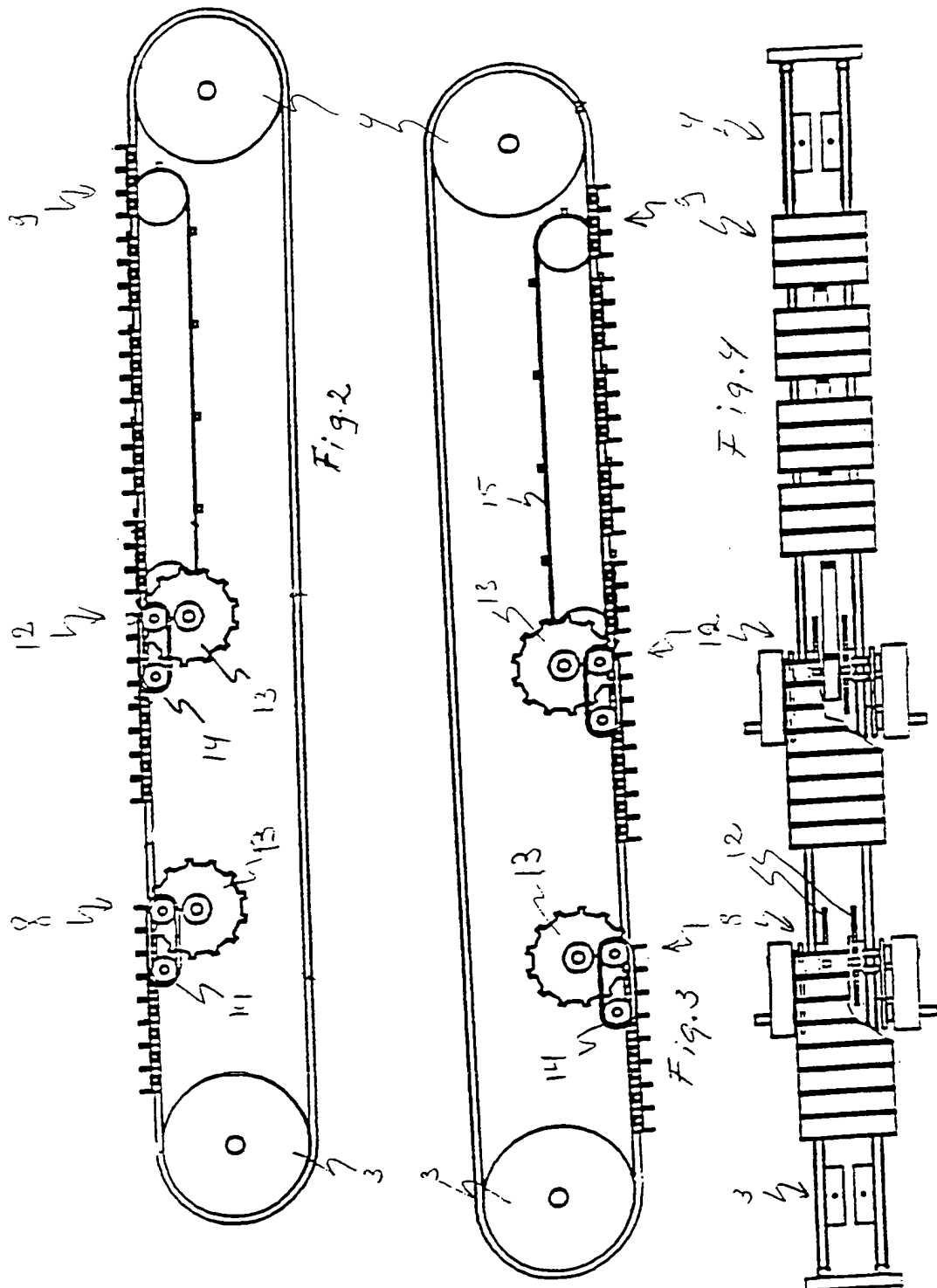
8. Device according to one of the preceding claims,
25 characterized in that between the return pulleys the belt runs over guide means (21, 22, 23), which guide means serve to hold the belt in the horizontal plane and also to hold the two belts at a desired distance from each other.

- 30 9. Device according to one of the preceding claims, characterized in that the belt is provided with two recesses or grooves which are placed at an angle to each other, and in that the guide means consist of two plate-shaped guides, in which an edge of one of the plates runs through
35 one groove, while the edge of the other plate runs through the other groove.

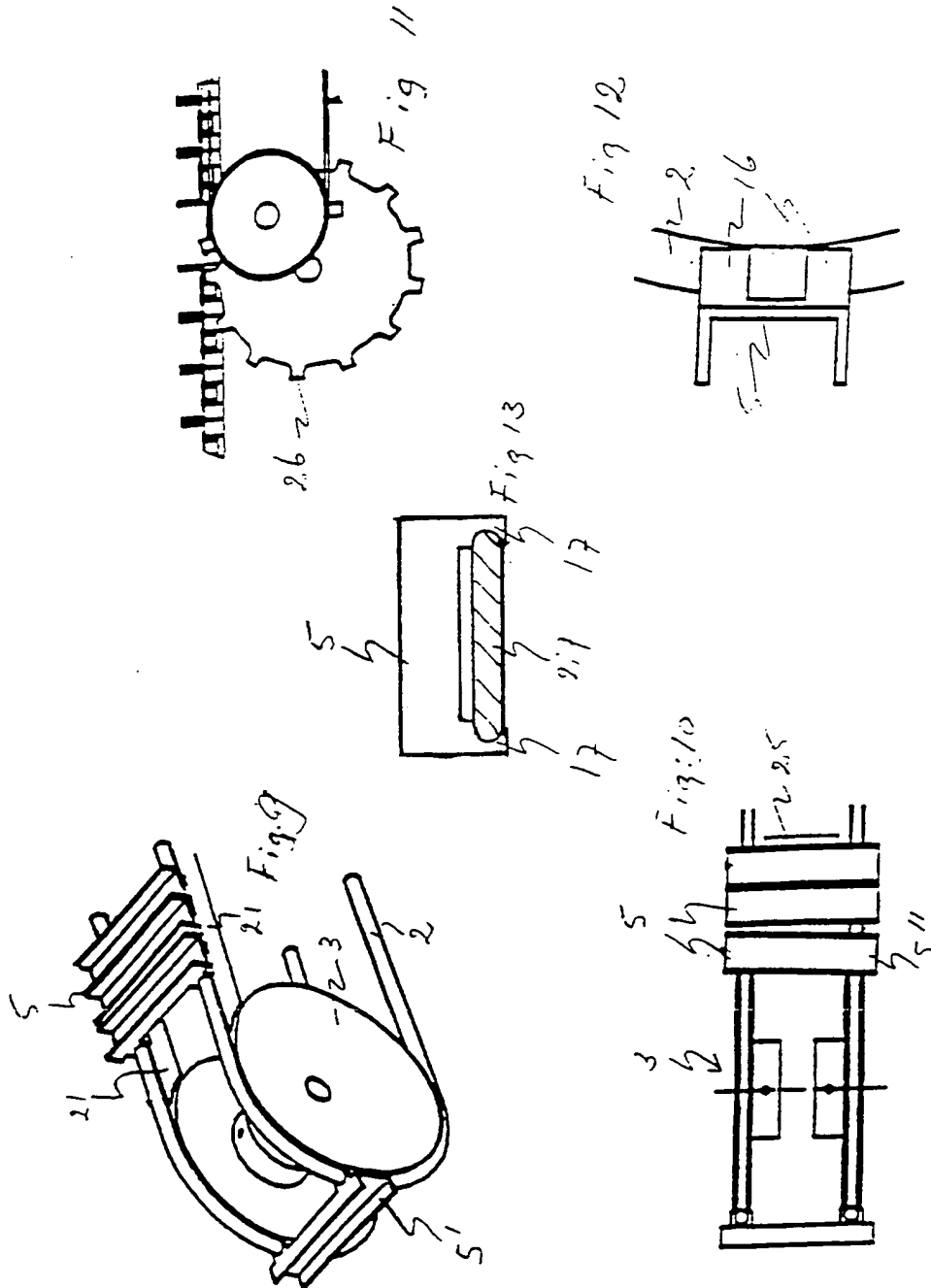
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INTERNATIONAL SEARCH REPORT

International Application No.

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 496 046 (GECA) 29 July 1992 cited in the application see the whole document ---	1
A	EP,A,0 276 409 (FERAG) 3 August 1988 see the whole document ---	1
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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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